Michael O. Leavitt
Governor
Ted Stewart
Executive Director
Lowell P. Braxton
Division Director

State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

January 15, 1998

TO: Minerals File

FROM: Tom Munson, Reclamation Hydrologist

RE: Documentation of Meeting, Western States Minerals, Drum Mine, M0/27/007, Millard County, Utah

Date of Meeting: January 13, 1997

1st Session:

Time: 10:00 a.m. - 12:00 noon

Participants: Terry McParland, BLM; Ron Teseneer, Fillmore BLM; Randy Harden, Mary Ann Wright, Wayne Hedberg, Tony Gallegos, and Tom Munson, DOGM

2nd Session:

Time: 2:00 - 4:30 p.m.

Participants: Buzz Garrick; Al Cerney and Jim Ashton, Western States Minerals; joined with DOGM and BLM.

Purpose of Meeting: To discuss the reclamation plans for Western States portion of the Drum Mine

First Meeting Session - DOGM and BLM staff

During the first session we went over issues regarding the reclamation of the waste dumps and heap leach operation for the Drum Mine. We put together a list of concerns or questions. We also talked about the issue of ground water quality. I introduced the meeting by talking about my conversations with Kevin Sullivan of the Department of Mining in Nevada, and Harry Possey of the Department of Mining and Minerals in Colorado. I introduced the fact that Harry Possey felt that the concern regarding cyanide and ground water was possibly related and any conjecture about water quality impacts could be tied directly to any kind of leach water that was collected. Well water analysis collected could be used as an indicator as well. Harry Possey stated that this well water could be used instead of any of the chemical parameters collected from the meteoric water mobility tests or the synthetic leaching procedures that Western had proposed to carry out in the overall testing of the Drum Mine.

After reviewing the proposed sampling plan, Mr. Possey's stated that the effluent samples would be the most representative. He also stated that based on the information I sent him, that arsenic was a possible concern, although it is a background mineral in the overall scheme of things.

Harry stated that the ore being a siliceous limestone ore and not a sulfitic ore gives it more credibility in terms of overall leachate parameters. Harry said that the pH was in a neutral zone between 7 and 8.5 that we could possibly disregard total cyanide and that WAD cyanide values. The numbers given were more background noise than a real problem. He also stated that the open well bores that Jumbo had sampled were probably worse case water quality due to the oxidation at the well bore. He felt that some of the meteoric water mobility tests and leaching tests were aggressive chemical tests and possibly would give a misrepresentation in terms of the overall actual chemical impacts. Harry felt that we did not need statistically valid samples from the heaps and waste dumps, but a more representative sample, if it was a homogenized mass of material. This would be better than a group of statistically valid samples and less costly. He also stated that he had not seen stratification in heaps where the water quality had gotten worse as you went deeper into the heap.

In my conversations with Kevin Sullivan, the Nevada Department of Mining, he stated that he would probably go ahead and do the testing but he also was of the opinion that the problems associated with this mine were probably somewhat minimal in terms of ground water and that we should focus more on the reclamation/revegetation aspects of the plan.

The meeting continued after I addressed these points in regards to what contacts I had with other states. We then discussed the ground water issues and came to the conclusion that ground water was not a great issue and that cover material for covering the heaps and waste dumps was probably the largest concern. We would have to investigate where we were going to get that cover material from. Was it going to come from borrow areas or was it going to come from material adjacent to the heaps or waste dumps? This was one of the questions we would talk about.

A list of the following questions was assembled in the first session with DOGM and the BLM. The answers, noted in italics, represents the responses from Western States Minerals when they joined the meeting during the second session.

1. Fine material availability for reclamation of heaps and dumps. Get it wherever you can?

   Yes.

2. Soil sampling from new borrow cover material planned?

   Yes. We would do a standard soils sampling on those areas

3. What are Western States Minerals Corporations reclamation plans?

   They would rough grade slopes in at 3:1; they would eliminate ponding on the heaps and dumps; and they would revegetate and cover with a suitable amount of material.

4. Prestrip topsoil from toes of heaps and waste dumps prior to regrading?

   Yes.

5. Agreement on amount of cover and topsoil material needed.

Western States plans were for one foot. Randy had brought up the point that four feet was what they consider adequate in the coal program. Although the Barrick Sunrise Mine was talked about and in that situation 18-24 inches was adequate.

6. Do we have adequate topsoil characterization?

We gave them a list of soil parameters and they were going to carry out an agronomic analysis.

7. Do we need deep sampling of the heaps.

This is a point of contention. Buzz Garrick from Western States Minerals discussed that the use of a drill that could do the deep sampling was a consideration that they would have to take into mind based on the fact that it was more costly, about $30,000 more to do the deep sampling using the drill and the drill itself would introduce air into the sample. That would possibly negate some of the parameters that we were interested in. This is all considerations, although deep sampling is still an issue and they may carry this out. Otherwise, they would use a trackhoe with a 25-foot boom and would sample 25 feet deep at each sampling site.

8. Waste dump #1 - is it Western's or Jumbo's responsibility?

The Division feels that it is Westerns and the BLM feels that it was transferred to Jumbo under a more recent letter to the BLM. At this point, we are putting this question to an administrative level to be sorted out.

9. Number of sample locations adequate?

Yes.

10. Are the heaps homogeneous?

Buzz Garrick said that the heaps were end dumped, so the course material cascaded to the bottom of the heaps and they were done from one side to the other; so you would tend to get the deeper end on one end of the dump or the other, not on the top as was previously thought.

11. Split sampling required?

Yes, they were going to split sample all their samples in quarters so they would have four samples from each sampling interval which was approximately every five feet.

12. Unit costs for sampling and chemical analysis?

Each water quality heap sample was $1,080. Each waste dump sample was $200. Each topsoil sample for the agronomic analysis was estimated about $225. The native soils adjacent to the heaps under Westerns proposal, was about $340.

13. Will WAD cyanide be done?

Yes, they will do WAD cyanide on their sampling analysis.

14. Sampling of the shallow aquifer.

It was suggested that a trench would be excavated in the borrow area near the area of the shallow aquifer. If water was encountered, possibly the Division or Western may take samples of that water to try and get a background water quality sample of the shallow aquifer.

Second Meeting Session - DOGM, BLM, and WSMC staff

During the second session, we started off by discussing how the samples would be taken. The samples were talked about in terms of taking a 5 kg minimum sample which would be crushed to a 2" minus or 5 cm and this would be used in the meteoric water mobility test (MWMT). The test uses a six inch column and it is run with an equal weight of water adjusted with nitric acid to a pH of 5.5 or 6. They would run that adjusted pH water through the column and capture the leachate water and run their chemical tests on that.

There would be an acid generation and neutralization potential test performed on the waste dumps and heaps. A synthetic precipitation leach procedure (SPLP) test would also be performed. With these results, they would probably use the help model, which is a ground water model, to project post reclamation runoff or infiltration.

WAD samples and acid generation potential will be run on the waste dumps. WAD cyanide will be run on the waste dumps because three heaps are located on the waste dumps. Soils will be tested for acid generation potential and neutralization, WAD cyanide and SPLP.

WSMC stated that the PVC liners underneath the heaps were 20 mil. They were laid down first with compacted native soils, then the leak detection system (a gravel or fine sand was put down with piping and then the 20 mil liners were laid over the top of that). It was decided that, based on the results of the studies and the testing, we could determine the competency of the liners or not, based on the contributions of any contaminants to ground water from the material that exists there now.

We went on to talk about the maximum deep of the heaps or the dumps was approximately 60 feet. Western asked us to send them the soil analyses data on file. The BLM and DOGM needed to resolve the issue of waste dump #1 reclamation responsibility as soon as possible. The BLM and State agreed to look into what alternative funding might be available to assist with the

waste characterization and reclamation of Jumbo Mining Company's portion concurrently with WSMC's characterization and reclamation activities.

WSMC was to provide a preliminary schedule for reclamation assuming an April 1, 1998 start up date. This was based on the completion of an Environmental Analysis (EA) by the BLM. They have to play catch-up with the existing disturbance on site which has never had an EA done on it, plus include the new potential borrow areas for cover and substitute soils that Ron Teseneer had identified outside of the property that could be used to reclaim the heaps and dumps. This would all be included in the EA and, hopefully, that would go under a 15-day comment period and the whole thing could be wrapped up and approved by April 1, 1998 and at that time Western States could initiate their waste characterization sampling program.

We also asked Western States Minerals to provide an amended plan which would include additional soils analyses and proposed conceptual reclamation plan. Ron Teseneer of the BLM would mark up a quad map or aerial photo of other possible soil borrow areas and send it to Western States Minerals. WSMC also needs to estimate the number of samples per acre to take from the soils borrow area. DOGM agreed to give them some assistance in regard to this if necessary.

jb
M027007.mtg